

SYSTEM AND METHOD FOR MINIMIZING INCREASES
IN VIA RESISTANCE BY APPLYING A NITROGEN
PLASMA AFTER A TITANIUM LINER DEPOSITION

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ABSTRACT OF THE DISCLOSURE

A system and method is disclosed for minimizing increases in
via resistance by applying a nitrogen plasma after a titanium liner
10 deposition. A via in a semiconductor device is formed by placing a
metal layer on a substrate and placing a layer of anti-reflective
coating (ARC) titanium nitride (TiN) over the metal layer. A layer
of dielectric material is placed over the ARC TiN layer and a via
passage is etched through the dielectric and partially through the
15 ARC TiN layer. A titanium layer is then deposited and subjected to
a nitrogen plasma process. The nitrogen plasma converts the
titanium layer to a first layer of titanium nitride. The first
layer of titanium nitride does not react with fluorine to form a
high resistance compound. Therefore the electrical resistance of
20 the first layer of titanium nitride does not significantly increase
during subsequent thermal cycles.